

Supplementary Material

Evaluating predator control using two non-invasive population metrics: a camera trap activity index and density estimation from scat genotyping

Jessica L. Keem^{A,}, Bronwyn A. Hradsky^A, Joe Benshemesh^B, Mark Le Pla^C, Abigail Watkins^D, Andrew R. Weeks^{E,F}, Anthony van Rooyen^F, John Black^F, and Darren Southwell^{A,G}*

^AQuantitative and Applied Ecology Group, School of Ecosystem and Forest Sciences, University of Melbourne, Parkville, VIC3010, Australia.

^BNational Malleefowl Recovery Group, VIC, Australia.

^CConservation Ecology Centre, Cape Otway, VIC3233, Australia.

^DParks Victoria Wimmera, Wail, VIC3414, Australia.

^EBio21 Institute, School of Biosciences, University of Melbourne, Parkville, VIC3010, Australia.

^FCesar Australia, Brunswick, VIC3056, Australia.

^GConservation Science Research Group, School of Environmental and Life Science, University of Newcastle, Callaghan, NSW2308, Australia.

*Correspondence to: Jessica L. Keem Quantitative and Applied Ecology Group, School of Ecosystem and Forest Sciences, University of Melbourne, Parkville, VIC 3010, Australia Email: jessica.keem@unimelb.edu.au

Supplementary Material

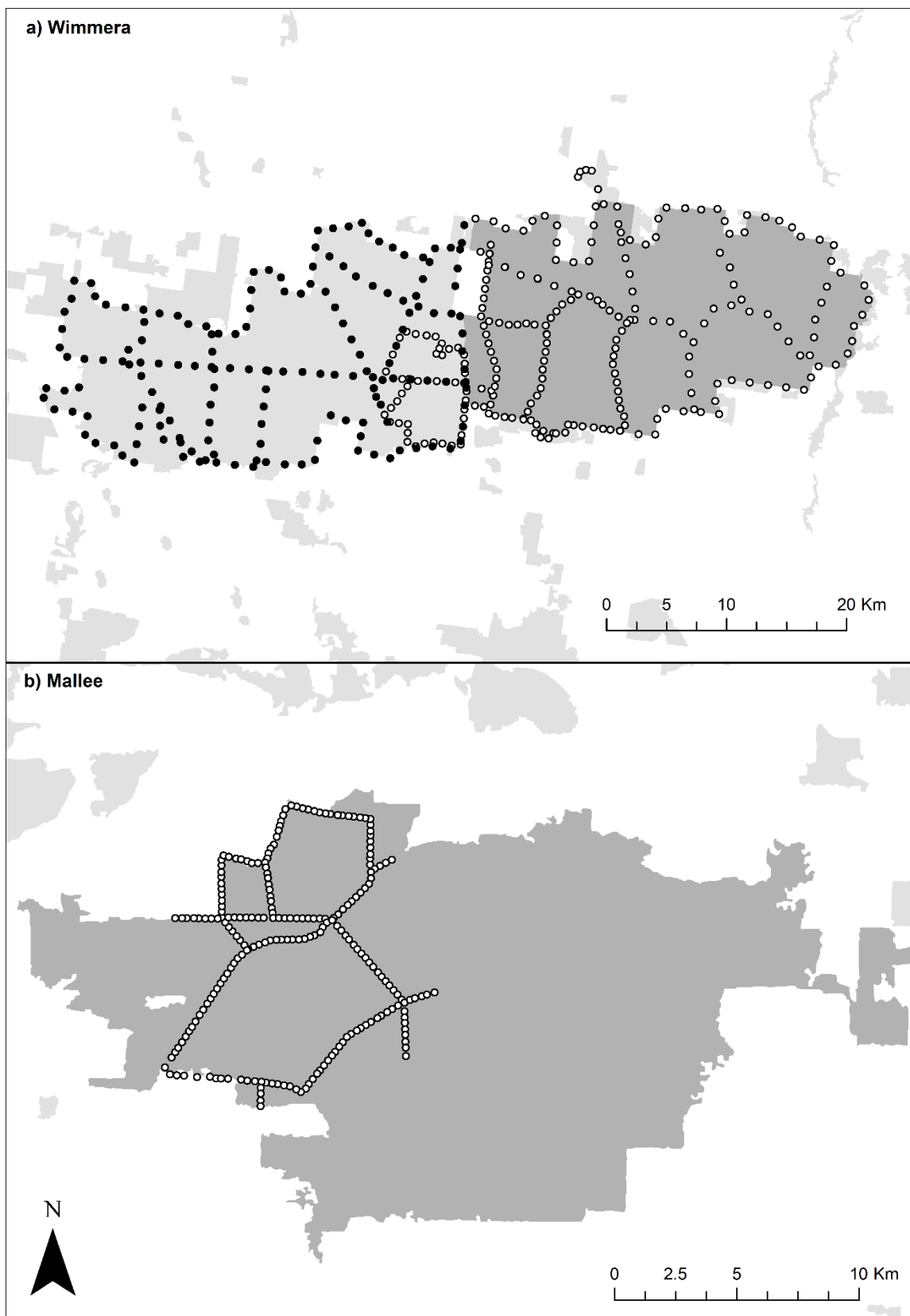


Fig. S1. Location of bait stations deployed at the two treatment sites (dark grey) in a) the Wimmera Central Block (black dots) and Eastern Block (white dots) and b) the Mallee (white dots).

Table S1. Full likelihood SECR models of fox density in the Wimmera and Mallee regions, Victoria, Australia, fit across 8 sampling sessions.

Models are defined with fox density (D) as constant (.), or varying according to treatment (t), period (p), and region (r). Parameters $g\theta$ (likelihood of detection) and σ (spatial scale) are defined as constant (.), or varying according to period (p), or sex (s). Number of parameters (npar), LogLk, ΔAIC_c and AICcwt follow Burnham and Anderson (2002).

Rank	Model	npar	LogLk	AICc	ΔAIC_c	AICcwt
1	$D \sim (t \times p + r) \ g\theta \sim (s) \ \sigma \sim (s)$	9	-1104.30	2228.00	0.00	0.13
2	$D \sim (t + p + r) \ g\theta \sim (s) \ \sigma \sim (s)$	8	-1105.44	2228.00	0.00	0.13
3	$D \sim (t \times p + r) \ g\theta \sim (.) \ \sigma \sim (.)$	7	-1106.60	2228.07	0.07	0.13
4	$D \sim (t + p + r) \ g\theta \sim (.) \ \sigma \sim (.)$	6	-1107.75	2228.14	0.14	0.12
5	$D \sim (t) \ g\theta \sim (s) \ \sigma \sim (s)$	6	-1108.11	2228.87	0.87	0.08
6	$D \sim (t) \ g\theta \sim (.) \ \sigma \sim (.)$	4	-1110.42	2229.14	1.14	0.07
7	$D \sim (t) \ g\theta \sim (p) \ \sigma \sim (p)$	6	-1108.28	2229.21	1.21	0.07
8	$D \sim (t + p \times r) \ g\theta \sim (s) \ \sigma \sim (s)$	9	-1105.21	2229.82	1.82	0.05
9	$D \sim (t + p \times r) \ g\theta \sim (.) \ \sigma \sim (.)$	7	-1107.51	2229.89	1.89	0.05
10	$D \sim (t \times p \times r) \ g\theta \sim (.) \ \sigma \sim (.)$	10	-1104.24	2230.21	2.21	0.04
11	$D \sim (t \times p \times r) \ g\theta \sim (s) \ \sigma \sim (s)$	12	-1101.94	2230.37	2.37	0.04
12	$D \sim (p) \ g\theta \sim (.) \ \sigma \sim (.)$	4	-1111.81	2231.93	3.93	0.02
13	$D \sim (t \times p + r) \ g\theta \sim (p) \ \sigma \sim (p)$	9	-1106.27	2231.95	3.95	0.02
14	$D \sim (t + p + r) \ g\theta \sim (p) \ \sigma \sim (p)$	8	-1107.46	2232.03	4.03	0.02
15	$D \sim (t + p \times r) \ g\theta \sim (p) \ \sigma \sim (p)$	9	-1107.18	2233.77	5.77	0.01
16	$D \sim (t \times p \times r) \ g\theta \sim (p) \ \sigma \sim (p)$	12	-1103.87	2234.24	6.24	0.01
17	$D \sim (.) \ g\theta \sim (.) \ \sigma \sim (.)$	3	-1114.40	2234.99	6.99	0.00

18	$D \sim (r) \ g \theta \sim (s) \ \sigma \sim (s)$	6	-1111.60	2235.83	7.83	0.00
19	$D \sim (p) \ g \theta \sim (p) \ \sigma \sim (p)$	6	-1111.60	2235.85	7.84	0.00
20	$D \sim (r) \ g \theta \sim (p) \ \sigma \sim (p)$	6	-1111.69	2236.01	8.01	0.00
21	$D \sim (r) \ g \theta \sim (.) \ \sigma \sim (.)$	4	-1113.90	2236.09	8.09	0.00
22	$D \sim (p) \ g \theta \sim (s) \ \sigma \sim (s)$	6	-1112.05	2236.74	8.74	0.00

Table S2. Relative standard error of top-ranked generalised linear mixed model of fox activity in the Wimmera and Mallee regions, Victoria, Australia.

Relative standard error (RSE) % of fox activity estimates from the model $C \sim (t \times p \times r)$, where fox captures (C) are defined by an interaction between treatment (t), period (p) and region (r). Estimates follow Efford and Boulanger (2019).

Region	Wimmera				Mallee			
Site	Non-treatment		Treatment		Non-treatment		Treatment	
Period	Unbaited	Baited	Unbaited	Baited	Unbaited	Baited	Unbaited	Baited
RSE (%)	339	339	339	339	11	19	82	50

Table S3. Relative standard error of top-ranked full likelihood SECR model of fox density in the Wimmera and Mallee regions, Victoria, Australia.

Relative standard error (RSE) % of fox density from the model $D \sim (t \times p + r) \ g \theta \sim (s) \ \sigma \sim (s)$, which follows Efford and Boulanger (2019). Models are defined with fox density (D) varying according to treatment (t), period (p), and region (r). Parameters $g \theta$ (likelihood of detection) and σ (spatial scale) are defined by sex (s).

Region	Wimmera				Mallee			
Site	Non-treatment		Treatment		Non-treatment		Treatment	
Period	Unbaited	Baited	Unbaited	Baited	Unbaited	Baited	Unbaited	Baited
RSE (%)	19	22	21	27	18	22	20	27